Physiotherapy Interventions in Stroke in COVID-19 – A Case Report

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Summary

A 67year old known hypertensive and diabetic right handed man who was diagnosed of stroke post COVID-19 and presented with impaired motor functions essentially of right limbs; trunk impairment; impaired balance and loss of ambulatory function was daily managed with paced capacity based physiotherapy protocols which was gradually increased within tolerated levels until he became stable ambulatory wise without any respiratory distress, at which point he was discharged from physiotherapy, Katz Score being 6/6 and gait speed which was 0.18m/s at start of ambulation rose to 1.47m/s with maximum ambulatory distance of 103m at a stretch and SPO_2 at 95%. Peripheral Agraphia identified at 7weeks post physiotherapy intervention was productively managed with Recall and Copy Treatment, RACT, the writing became very legible.The adopted physiotherapy interventions ensured Physical Activity Reactivation (PAR) with the patient being able to 'step out' with reassured health life and integration into normal activities of daily living (ADL). The Functional Physical Activity Tempo (FPAT) can be sustained post COVID Rehabilitation once it's well considered and integrated into rehabilitation protocols.

Key Words: *Paced Capacity, Physiotherapy Protocols, Gait Speed, Recall and Copy Treatment, Physical Activity Reactivation, Functional Physical Activity Tempo.*

Background

Coronavirus disease 2019 (COVID-19 was reported in December 2019 in Wuhan, Hubei province, China; the causative organism being a novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The incidence of COVID-19 is mostly in adult male with median age between 34 and 59years[1, 2] and comorbidities[3]; the highest proportion of severe cases occurs in adults > 60years of age[1,2]. The clinical presentations in COVID-19 include fever, dry cough, dyspnoea, chest pain, fatigue and myalgia while the less common symptoms are headache, abdominal pain, diarrhoea, sputum production, haemoptysis and diarrhoea[4]. Also reported were possible complications like hypoxaemia, arrhythmia, shock, acute cardiac injury and acute renal injury[4, 5]. Community transmission is a common mode of transmission and is usually interrupted by isolating infected people hence the emergence of isolation centers[6]. Acute ischaemic stroke may occur in patients with COVID-19 and usually in the presence of other cardiovascular risk factors. The risk of discharge to destination other than home or death increased 2-fold with occurrence of acute ischaemic stroke in patients with COVID-19[7]. A research work suggests pneumonia in COVID-19 patients is linked to viral-induced changes in the brain as MRI scans revealed 57.9% of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infected patients had recent brain lesions; focal neurological manifestations were seen in some and

non-focal neurological manifestations were seen in others but the most significant lesions came from territorial infarcts or cerebral haemorrhaging[8]. Daynes et al[9] using aerobics (Walking/Treadmill based) with strengthening training reported that COVID-19 Rehabilitation appears feasible & significantly improves clinical outcomes with no adverse effects recorded & no drop outs related to symptom worsening.

Case Presentation

Patient was a 67year old known hypertensive and diabetic right handed man who had low grade intermittent fever and unproductive, non-paroxysmal cough one month prior to presentation. There was no history of difficulty in breathing/chest pain and no known contact with COVID-19. Hitherto he has had good BP & glycaemic control with good drug compliance. Patient tested positive to COVID-19 three days after onset of present condition and progressive generalised body weakness a day later with poor appetite. Partial loss of memory set in right from onset of this condition. Patient is not a known asthmatic and had no previous surgery or blood transfusion. There was no history of alcohol ingestion or cigarette smoking. On admission, SPO_2 was 90% (room air); BP 135/75mmHg; PR 94bpm; Body Temperature 36.5^0C. He was placed on intra nasal oxygen ($INO_{2)}$ upon admission, this was removed 3 days laterby which time SPO_2 was 95% (room air); BP 119/77mmHg; PR 80bpm. Three weeks after onset of condition patient presented with Ischaemic left hemispheric CVD with reduced motor function of right limbs and loss of functional abilities – trunk control;balance; sitting; standing and walking. He tested negative to COVID-19 one month after initial positive result.

Physiotherapy intervention commenced three weeks post onset of condition. Upon assessment, patient was conscious but not well oriented in time, place & position; the gross muscle power (GMP), right UL & LL = 1; Left UL & LL =3. Left power grip was poor while right power grip was good. Reflexes in right limbs were 1+ and normal in left limbs. The left limbs were hypotonic. There was reduced PROM at lumbosacral joints with difficulty in passively assuming sitting posture and attendant pain at L2-L5, no swelling and no tenderness. Chest was clinically clear with adequate air entry. Katz Score was 0/6. Physiotherapy impressions were impaired motor functions of all limbs right > left; impaired balance and reduced exercise tolerance.

Treatment

Initial treatment protocols were assisted breathing exercises; assisted active exercises to right limbs; free active exercises to left limbs; passive mobilization exercises to lumbosacral joints; gripping exercises and therapeutic position of right limbs.Vital Signs (BP, PR, Body Temperature, SPO_2) and auscultations were done, pre and post treatment intervention. Patient was treated daily throughout the week. 5days post assessment, patient made neurological improvements, the gross muscle power (GMP), right UL & LL = 2; Left UL & LL =4; power grip, left=fair & right=good; SPO_2 was 94% (room air). Improvised Spirometry (with balloon because the patient couldn't cope with spirometer); Strengthening exercises, Trunk Stability exercises & Sitting re-education started 8 days post assessment; these were added to initial treatment protocols. Standing and Ambulatory commenced 8 days post assessment. Ambulation was done with Physiotherapist's assistance, a distance of 4ft x 2reps was covered, pre SPO_2 and post SPO_2 were 95% & 97% (room air), respectively.

Outcome and Follow-up

5 days post assessment, patient made neurological

improvements, the gross muscle power (GMP), right UL & LL = 3; Left UL & LL =5; good trunk balance and Katz Score 2/6 (feeding & transfer). Patient achieved unsupported standing for 5mins at $7^1/_2$ weeks post commencement of Physiotherapy and unloaded bicycle ergometer (10mins) was included in the treatment protocol at this time. Peripheral Agraphia was observed when this intervention was 7weeks old and patient was subsequently placed on writing skill exercise (to increase muscle strength, improve coordination and muscle memory) in a book. Patient had to recall and write events he went through each day (Recall and Copy Treatment, RACT). This is timed and dated in this book as it's done to monitor progress.

Gait Speed which was 0.18m/s at start of ambulation grew to 1.47m/s, patient being able to walk 103 m distance at a stretchwith SPO_2 at 95% and 15 mins unsupported standingat 13 weeks post commencement of Physiotherapy. The final stage of ambulation was treadmill exerciseswhich started at 14 weeks post initiation of this interventions. Initial protocol of 5mins, 0.0 incline, Speed 0.8 KPH was progressively increased to 10mins, 0.0 incline, Speed 1.6 KPH (after 8 days); 15mins, 0.0 incline, Speed 2.4 KPH (after another 7days); 20mins, 0.0 incline, Speed 3.2 KPH (after another 7 days) and treatment intervention at 25 mins, 0.0 incline, Speed 4.8KPH (after another 14 days), a protocol the patient was maintained on till discharge after being on treadmill for 46 days.

At point of discharge from Physiotherapy, patient had global GMP of 5; bilateral power grip –good; Katz Score 6/6. Writing skill which commenced when the intervention was 7weeks old became very legible with average writing of 2-3pages per day. Patient was discharged on walking exercises within his compound with monitoring of SPO_2, BP, PR& Body Temperature.

Conclusion

Physiotherapy interventions have proven to be productively deployed in the management of neurological complications arising from COVID-19. Patient with post COVID -19 stroke can be rehabilitated to independent functional level with subsequent reintegration into the society having improved ADL; stable gait and reasonable gait speed and active participation in daily living while being breathlessness free without desaturation.

Ethical Clearance – Taken from Institutional Research Ethical Committee, JUTH, Nigeria (JUTH/DCS/IREC/127/XXXI/2715).

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Conflict of Interest – Nil

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